

Remarks

Claims 1-15 and 21-30 are pending in the Application.

Claims 1-15 and 21-30 stand rejected.

Claims 1 and 21 are amended herein.

I. **REJECTIONS UNDER 35 U.S.C. § 102 OVER WEISS**

Examiner has rejected Claims 1-5, 8, 10, 11, 14, 21, 22, 25 and 26 under 35 U.S.C. § 102(b) as being anticipated by Weiss et al., U.S. Patent No. 5,990,497 ("Weiss"). Office Action, at 2.

Claims 1 and 21 have been amended to further limit the adsorption of the chemical species to physisorption, and to limit the exposing to gas phase and/or solid phase exposures. Support for such amending can be found in the Application as follows: (a) physisorption on page 8, *ll. 17-19*; and (b) exposure conditions on page 4, *ll. 19-20*. No new matter is introduced as a result of such amending.

As mentioned in a previous response, *Weiss* teaches a luminescent semiconductor nanocrystal compound comprising: (1) a semiconductor nanocrystal, and (2) a linking agent having a first portion linked to the semiconductor nanocrystal, and a second portion capable of linking to an affinity molecule. Together with the affinity molecule, the luminescent semiconductor compound forms a organo luminescent semiconductor nanocrystal probe capable of bonding to a detectable substance in a material. *Weiss*, col. 2, *ll. 18-42*. This is no different than fluorescent dye labels, except that it has the advantage of being able to label a material with a single type of probe for both electron microscopy and fluorescence. *Weiss*, col. 1, *l. 23-col. 2, l. 2*. Furthermore, there is no bonding/binding between the nanocrystal and the detectable substance—it is all done through linker species and affinity molecules.

Applicant respectfully points out that *Weiss* does not teach a process for detecting chemical species (i.e., analytes) based on their physisorption onto the surface of a nanoparticle and detecting the altered photoluminescence properties of the nanoparticle as a result of such

physisorption of the chemical species—as required by Claims 1 and 21. Accordingly, Claims 1 and 21, and all claims depending directly or indirectly therefrom, are not anticipated by *Weiss*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 1-5, 8, 10, 11, 14, 21, 22, 25 and 26 under 35 U.S.C. § 102(b) as being anticipated by *Weiss*.

II. REJECTIONS UNDER 35 U.S.C. § 102 OVER DANIELS

Examiner has rejected Claims 1-5, 8, 12, 15, 21, 22, 27 and 29 under 35 U.S.C. § 102(b) as being anticipated by Daniels et al., U.S. Patent Application Publication No. 20020004246 ("Daniels"). Office Action, at 3.

Daniels teaches an immunochromatographic test strip assay which utilizes quantum dots as detectable labels. Like *Weiss* above, *Daniels* requires a targeting compound bound to the nanocrystals, wherein the targeting compound "has affinity for one or more selected biological or chemical targets." *Daniels*, para. 16. Thus, the analyte is not in direct contact (via surface physisorption) with the nanocrystals, and no change in the luminescent properties of the nanocrystal are monitored—as required by Claims 1 and 21 of the present Application. Additionally, *Daniels* does not gas and/or solid phase exposure. Accordingly, Claims 1 and 21, and all claims depending directly or indirectly therefrom, are not anticipated by *Daniels*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 1-5, 8, 12, 15, 21, 22, 27 and 29 under 35 U.S.C. § 102(b) as being anticipated by *Daniels*.

III. REJECTIONS UNDER 35 U.S.C. § 102 OVER CHEE

Examiner has rejected Claims 1-3, 5, 6, 8, 10, 11 and 14 under 35 U.S.C. § 102(b) as being anticipated by Chee et al., U.S. Patent No. 6,544,732 ("Chee"). Office Action, at 3.

Chee teaches a biological assay comprising beads or microspheres to which chemical functionality (i.e., bioactive agents) is imparted. Nanocrystals can be incorporated into the beads in lieu of fluorescent dyes so as to provide for a unique optical signature for that particular bead. *Chee*, col. 3, ll. 41-56.

As in the case of *Weiss* and *Daniels*, *Chee* utilizes nanocrystals merely as fluorescent labels. Such nanocrystals (nanoparticles) do not interact directly with the biological molecules (analyte) being assayed by having the analyte physisorb onto the surface of the nanocrystal under a gas and/or solid phase exposure—as required by Claims 1 and 21 of the present Application. Accordingly, Claims 1 and 21, and all claims depending directly or indirectly therefrom, are not anticipated by *Chee*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 1-3, 5, 6, 8, 10, 11 and 14 under 35 U.S.C. § 102(b) as being anticipated by *Chee*.

IV. REJECTIONS UNDER 35 U.S.C. § 102 OVER BARBERA-GUILLEM

Examiner has rejected Claims 1-3, 5, 6, 8, 10, 11 and 14 under 35 U.S.C. § 102(b) as being anticipated by *Barbera-Guillem* et al., U.S. Patent No. 6,261,779 ("*Barbera-Guillem*"). Office Action, at 3-4.

Barbera-Guillem teaches an amplifiable nonisotopic detection system for biological molecules that comprises "nanocrystals that are functionalized to be water-soluble, and further functionalized to comprise a plurality of polynucleotide strands of known sequence which extend outwardly from each nanocrystal." *Barbera-Guillem*, col. 2, ll. 13-19.

As in the cases of *Weiss*, *Daniels* and *Chee* above, *Barbera-Guillem* utilizes nanocrystals as fluorescent labels. Such nanocrystals (nanoparticles) do not interact directly with the biological molecules (analyte) being assayed by having the analyte physisorb onto the surface of the nanoparticles under a gas and/or solid phase exposure—as required by Claim 1 of the present Application. Accordingly, Claim 1, and all claims depending directly or indirectly therefrom, are not anticipated by *Barbera-Guillem*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 1-3, 5, 6, 8, 10, 11 and 14 under 35 U.S.C. § 102(b) as being anticipated by *Barbera-Guillem*.

V. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS AND DANIELS IN VIEW OF CHEE AND BARBERA-GUILLEM

Examiner has rejected Claims 6 and 23 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Chee* and *Barbera-Guillem*. Office Action, at 4.

Claim 6 merely introduces an additional limitation, in terms of the kinds of chemical species being investigated, to Claim 1. Since Claim 6 depends directly from Claim 1, and as Claim 1 is neither anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels*, *Chee* and *Barbera-Guillem* (see above), neither is Claim 6 anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels*, *Chee* and *Barbera-Guillem*. Likewise, Claim 23 merely introduces an analogous additional limitation, in terms of the kinds of chemical species being investigated, to Claim 21. Since Claim 23 depends directly from Claim 21, and as Claim 21 is neither anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels*, *Chee* and *Barbera-Guillem* (see above), neither is Claim 23 anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels*, *Chee* and *Barbera-Guillem*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 6 and 23 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Chee* and *Barbera-Guillem*.

VI. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS, DANIELS, CHEE AND BARBERA-GUILLEM IN VIEW OF HARRIS

Examiner has rejected Claim 7 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* and *Chee* and *Barbera-Guillem* in view of Harris et al, U.S. Patent Application Publication No. 20040009911 ("Harris"). Office Action, at 4.

Of paragraphs 8, 16, 156, and 161 in *Harris* to which Examiner points, only paragraphs 16 and 161 appear to discuss quantum dots. Furthermore, Applicant is unclear as to which processes of *Harris* are deemed reversible by the Examiner. Regardless, as Claim 1 (from which Claim 7 directly depends) is neither anticipated by, nor obvious in view of, any combination of *Weiss*, *Daniels*, *Chee*, *Barbera-Guillem*, and *Harris*, neither is Claim 7 anticipated by, nor obvious in view of, any combination of *Weiss*, *Daniels*, *Chee*, *Barbera-Guillem* and *Harris*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 7 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* and *Chee* and *Barbera-Guillem* in view of *Harris*.

VII. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS, DANIELS, CHEE AND BARBERA-GUILLEM IN VIEW OF WEST

Examiner has rejected Claim 9 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* and *Chee* and *Barbera-Guillem* in view of West et al, U.S. Patent No. 6,530,944 ("West"). Office Action, at 5.

The passage in *West* to which Examiner points (*West*, col. 16, ll. 5-8) regards delivery of nanoparticles to a human patient as a diagnostic tool (i.e., imaging agent), or as part of a therapeutic treatment, wherein such delivery is provided by a *nasal spray*. Considering the dissimilar nature of the arts involved, it would not have been obvious to combine the teachings of *West* with *Weiss* and *Daniels* and *Chee* and *Barbera-Guillem*. Regardless, as Claim 1 (from which Claim 9 directly depends) is neither anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels*, *Chee*, *Barbera-Guillem* and *West*, neither is Claim 9 anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels*, *Chee*, *Barbera-Guillem* and *West*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 9 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* and *Chee* and *Barbera-Guillem* in view of *West*.

VIII. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS, CHEE AND BARBERA-GUILLEM IN VIEW OF DANIELS

Examiner has rejected Claims 12, 13, and 15 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss*, *Chee* and *Barbera-Guillem* in view of *Daniels*. Office Action, at 5.

As mentioned above, none of *Weiss*, *Daniels*, *Chee* and *Barbera-Guillem*, either alone or in combination, provide for or suggest the process of Claim 1. As Claims 12, 13, and 15 all depend directly from Claim 1, for the same reasons, they too are not anticipated by, or obvious in view of, any combination of *Weiss*, *Daniels*, *Chee* and *Barbera-Guillem*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 12, 13, and 15 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss, Chee and Barbera-Guillem* in view of *Daniels*.

IX. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS, DANIELS, CHEE AND BARBERA-GUILLEM IN VIEW OF RAVKIN

Examiner has rejected Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss, Daniels, Chee and Barbera-Guillem* in view of Ravkin et al., U.S. Patent No. 6,908,737 ("Ravkin"). Office Action, at 5.

Like *Weiss, Daniels, Chee and Barbera-Guillem*, *Ravkin* also teaches the use of nanocrystals as fluorescent labels, wherein such fluorescent labels are disposed on or otherwise associated with coded carriers used in the detection and quantification of generally biological analytes, wherein the carriers generally comprise biological probe molecules. *See Ravkin*, Abstract and col. 14, ll. 38-60. None of *Weiss, Daniels, Chee, Barbera-Guillem*, and *Ravkin* teach or suggest a process of detecting chemical species by their physisorption onto a nanoparticle surface under a gas and/or solid phase exposure and subsequently evaluating the altered photoluminescence of the nanoparticle as a result of such physisorption—as required by Claim 1. As Claim 13 depends directly from Claim 1, it is not anticipated by, or obvious in view of, any combination of *Weiss, Daniels, Chee, Barbera-Guillem* and *Ravkin* for the same reasons Claim 1 is not anticipated by, or obvious in view of, any combination of *Weiss, Daniels, Chee, Barbera-Guillem, Ravkin*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss, Daniels, Chee and Barbera-Guillem* in view of *Ravkin*.

X. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS AND DANIELS IN VIEW OF HARRIS

Examiner has rejected Claim 24 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Harris*. Office Action, at 5.

As mentioned above, of paragraphs 8, 16, 156, and 161 in *Harris* to which Examiner points, only paragraphs 16 and 161 appear to discuss quantum dots. Furthermore, Applicant remains unclear as to which processes of *Harris* are deemed reversible by the Examiner. Regardless, as Claim 21 (from which Claim 24 directly depends) is neither anticipated by, nor obvious in view of, any combination of *Weiss*, *Daniels*, and *Harris*, neither is Claim 24 anticipated by, nor obvious in view of, any combination of *Weiss*, *Daniels*, and *Harris*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 24 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Harris*.

XI. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS IN VIEW OF DANIELS

Examiner has rejected Claims 27-29 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* in view of *Daniels*. Office Action, at 5-6.

Claims 27-29 depend directly from Claim 21. As Claim 21 is neither anticipated by, nor obvious in view of, the combination of *Weiss* and *Daniels*, neither are Claims 27-29 anticipated by, nor obvious in view of, the combination of *Weiss* and *Daniels*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claims 27-29 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* in view of *Daniels*.

XII. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS AND DANIELS IN VIEW OF RAVKIN

Examiner has rejected Claim 28 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Ravkin*. Office Action, at 6-7.

As mentioned above, *Ravkin* teaches the use of nanocrystals as fluorescent labels, wherein such fluorescent labels are disposed on or otherwise associated with coded carriers used in the detection and quantification of generally biological analytes, wherein the carriers generally comprise biological probe molecules. See *Ravkin*, Abstract and col. 14, ll. 38-60. None of *Weiss*, *Daniels*, and *Ravkin* teach or suggest a process of detecting chemical species by their physisorption onto a nanoparticle surface under a gas and/or solid phase exposure and

subsequently evaluating the altered photoluminescence of the nanoparticle as a result of such physisorption—as required by Claim 21. As Claim 28 depends directly from Claim 21, it is not anticipated by, or obvious in view of, any combination of *Weiss*, *Daniels*, and *Ravkin* for the same reasons Claim 21 is not anticipated by, or obvious in view of, any combination of *Weiss*, *Daniels*, and *Ravkin*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 28 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Ravkin*.

XIII. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS AND DANIELS IN VIEW OF WEST

Examiner has rejected Claim 30 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *West*. Office Action, at 7.

As mentioned above, the passage in *West* to which Examiner points (*West*, col. 16, ll. 5-8) regarding an aerosol actually involves delivery of nanoparticles to a human patient as a diagnostic tool (i.e., imaging agent), or as part of a therapeutic treatment, wherein such delivery is provided by a nasal spray. Considering the dissimilar nature of the arts involved, it would not have been obvious to combine the teachings of *West* with *Weiss* and *Daniels*. Regardless, as Claim 21 (from which Claim 30 directly depends) is neither anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels* and *West*, neither is Claim 30 anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels* and *West*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 30 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *West*.

XIV. REJECTIONS UNDER 35 U.S.C. § 103 OVER WEISS AND DANIELS IN VIEW OF CHEE

Examiner has rejected Claim 30 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Chee*. Office Action, at 7.

Applicant respectfully points out that the passages to which the Examiner points in *Chee* (col. 1, ll. 10-13, and 25-30; and col. 2, ll. 59-64), refer to prior art methods and not to the invention of *Chee*. *Chee* does not teach using nanoparticle-based sensors and assays for detecting analyte gases, nor does *Chee* suggest how such sensors and assays might be used for detecting such analyte gases. Regardless, as Claim 21 (from which Claim 30 directly depends) is neither anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels* and *Chee*, neither is Claim 30 anticipated by, nor obvious in view of any combination of *Weiss*, *Daniels* and *Chee*.

As a result of the foregoing, Applicant respectfully requests that the Examiner withdraw the rejection of Claim 30 under 35 U.S.C. § 103(a) as being unpatentable over *Weiss* and *Daniels* in view of *Chee*.

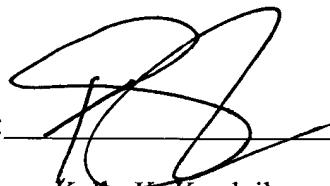
XV. CONCLUSION

As a result of the foregoing, it is asserted by Applicant that the Claims in the Application are presently in a condition for allowance, and respectfully request an allowance of such Claims. Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

Respectfully submitted,

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